

U.S. Patent Application Serial No. 09/800,515
Amendment dated November 21, 2003
Reply to OA of August 28, 2003

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently Amended): A method for diagnosing the normality/abnormality of an output of an installed photovoltaic power system, comprising the steps of:

comparing a reference output characteristic obtained chronologically in accordance with an installation condition of said photovoltaic power system with a measured output characteristic in said photovoltaic power system obtained during operation of the photovoltaic power system itself, said installation condition includes a topography of an installation site, meteorological conditions and configuration of the photovoltaic power system, and

diagnosing the normality/abnormality of the output of said photovoltaic power system based on the comparison result,

wherein said photovoltaic power system is diagnosed as normal only if said measured output characteristic is greater than a first predetermined value and less than a second predetermined value, said first and second predetermined values being based on said reference output characteristic.

Claim 2 (original): The diagnosis method according to claim 1, wherein the installation condition of said photovoltaic power system includes, at least, one of the following installation site, installation direction, installation angle and configuration.

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Claim 3 (original): The diagnosis method according to claim 1, further comprising the step of:

diagnosing the cause, in the case that the output of said photovoltaic power system is abnormal, based on the comparison result.

Claim 4 (original): The diagnosis method according to claim 1, wherein the reference output characteristic and the output characteristic include, at least, one of the following: direct current voltage, alternating current voltage, direct current electric energy and alternating current electric energy.

Claim 5 (Currently Amended): A method for diagnosing the normality/abnormality of an output of an installed photovoltaic power system, comprising the steps of:

calculating ~~a change with time lapse of~~ a reference output characteristic chronologically at the time of normal operation of the photovoltaic power system itself in accordance with an installation condition of said photovoltaic power system;

measuring ~~a change with time lapse of~~ an output characteristic chronologically in said photovoltaic power system obtained during operation of the photovoltaic power system itself;

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comparing the calculated ~~change with time lapse of~~ reference output characteristic chronologically with the measured ~~change with time lapse of~~ output of said photovoltaic power system based on the comparison result.

Claim 6 (original): The diagnosis method according to claim 5, wherein
the installation condition of said photovoltaic power system includes, at least, one of the following: installation site, installation direction, installation angle and configuration.

Claim 7 (original): The diagnosis method according to claim 5, further comprising the step of:

diagnosing the cause, in the case that the output of said photovoltaic power system is abnormal, based on the comparison result.

Claim 8 (original): The diagnosis method according to claim 5, wherein
the reference output characteristic and the output characteristic include, at least, one of the following: direct current voltage, alternating current voltage, direct current electric energy and alternating current electric energy.

Claim 9 (Currently Amended): A method for diagnosing the normality/abnormality of an output of a photovoltaic power system, comprising the step of:

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diagnosing the normality/abnormality of the output of said photovoltaic power system during operation based on the past measurement result of ~~a change with time lapse of~~ an output characteristic chronologically of said photovoltaic power system itself.

Claim 10 (Currently Amended): A method for diagnosing the normality/abnormality of an output of a photovoltaic power system, comprising the steps of:

~~obtained a change with time lapse of~~ obtaining a reference output characteristic chronologically at the time of normal operation of the photovoltaic power system itself in accordance with past measurement result of ~~a change with time lapse of~~ an output characteristic of said photovoltaic power system;

measuring ~~a change with time lapse of~~ an output characteristic chronologically in said photovoltaic power system during operation of the photovoltaic power system itself;

comparing the obtained ~~change with time lapse of~~ reference output characteristic chronologically with the ~~measurement change with time lapse of~~ measured output characteristic;

and

diagnosing the normality/abnormality of the output of said photovoltaic power system based on the comparison result.

Claim 11 (original): The diagnosis method according to claim 10, wherein

the reference output characteristic is obtained differently for each period of time among the

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plurality of periods of time gained by dividing a year.

Claim 12 (original): The diagnosis method according to claim 10, wherein
in the case that the output of said photovoltaic power system is diagnosed as being abnormal,
the output characteristic at that time output of said photovoltaic power system is diagnosed as being
normal the output characteristic at that time is reflected in the subsequent reference output
characteristic.

Claim 13 (original): The diagnosis method according to claim 10, further comprising the
step of:

diagnosing the cause, in the case that the output of said photovoltaic power system is
abnormal, based on the comparison result.

Claim 14 (original): The diagnosis method according to claim 10, wherein
the reference output characteristic and the output characteristic include, at least, one of the
following: direct current voltage, alternating current voltage, direct current electric energy and
alternating current electric energy.

Claim 15 (Currently Amended): A method for diagnosing the normality/abnormality of an
output of a photovoltaic power system, comprising the steps of:

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obtaining a reference output characteristic at the time of normal operation of a first photovoltaic power system to be diagnosed in accordance with a measurement result of output characteristic of a second photovoltaic power system, said first and second photovoltaic power system being installed at different sites;

measuring an output characteristic in said first photovoltaic power system during operation;

comparing the obtained reference output ~~characteristics~~ characteristic with the measured output characteristic; and

diagnosing the normality/abnormality of the output of said first photovoltaic power system based on the comparison result.

Claim 16 (Currently Amended): An apparatus for carrying out a diagnosis of the normality/abnormality of an output of an installed photovoltaic power system and/or a diagnosis of the cause whenever the output of said photovoltaic power system is abnormal, comprising:

a storage unit for storing ~~a change with time lapse~~ of a reference output characteristic chronologically at a time of normal operation of the photovoltaic power system itself in accordance with an installation condition of said photovoltaic power system;

a measurement unit for measuring ~~a change with time lapse~~ of an output ~~characteristics~~ characteristic chronologically in said photovoltaic power system during operation of the photovoltaic power system itself; and

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a comparison unit for comparing ~~the change with time lapse of~~ the reference output characteristic chronologically stored in said storage unit with the measured ~~change with time lapse of~~ the output characteristic obtained by said measurement unit,

wherein said photovoltaic power system is diagnosed as normal only if said measured output characteristic is greater than a first predetermined value and less than a second predetermined value, said first and second predetermined values being based on said reference output ~~characteristics~~ characteristic.

Claim 17 (original): The diagnosis apparatus according to claim 16, further comprising:
a storage unit for storing the output characteristic measured by said measurement unit.

Claim 18 (original): The diagnosis apparatus according to claim 16, further comprising:
a solar radiation amount measurement unit for measuring an amount of solar radiation in said photovoltaic power system.

Claim 19 (Currently Amended): An apparatus for carrying out a diagnosis of the normality/abnormality of an output of an installed photovoltaic power system and/or a diagnosis of the cause in the case that the output of said photovoltaic power system is abnormal, comprising:
an input unit for accepting an input of an installation condition of said photovoltaic power system; and that the and

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a calculation unit for calculating ~~a change with time lapse of~~ a reference output characteristic chronologically of said photovoltaic power system itself, in accordance with the installation condition inputted to said input unit;

a measurement unit for measuring ~~a change with time lapse of~~ an output characteristic chronologically in said photovoltaic power system during operation of the photovoltaic power system itself; and

a comparison unit for comparing ~~change with time lapse of~~ the reference output characteristic chronologically calculated by said calculation unit with the measured ~~change with time lapse of~~ output characteristic obtained by said measurement unit.

Claim 20 (original): The diagnosis apparatus according to claim 19, further comprising:

a storage unit for storing output the characteristic measured by said measurement unit.

Claim 21 (original): The diagnosis apparatus according to claim 19, further comprising:

a solar radiation amount measurement unit for measuring an amount of solar radiation in said photovoltaic power system.

Claim 22 (Currently Amended): An apparatus for carrying out a diagnosis of the normality/abnormality of an output of a photovoltaic power system, comprising:

a storage unit for storing a past measurement result of ~~a change with time lapse of~~ an

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output characteristic chronologically of said photovoltaic power system; and
a diagnosis unit for diagnosing the normality/abnormality of the output of said photovoltaic power system based on the measurement result of the photovoltaic power system itself stored in said storage unit.

Claim 23 (original): The diagnosis apparatus according to claim 22, further comprising:
a determination unit for determining the cause of the abnormality in the case the output of said photovoltaic power system is diagnosed, by said diagnosis unit, as being abnormal.

Claim 24 (original): The diagnosis apparatus according to claim 22, further comprising:
a solar radiation amount measurement unit for measuring an amount of solar radiation in said photovoltaic power system.

Claim 25 (Currently Amended): A method for diagnosing the normality/abnormality of an output of an installed photovoltaic power system, comprising the steps of:
comparing ~~a change with time lapse~~ of a reference output characteristic chronologically obtained in accordance with an installation condition of said photovoltaic power system with a ~~change with time lapse~~ of a measured output characteristic in said photovoltaic power system obtained during operation of the photovoltaic power system itself; and
diagnosing the normality/abnormality of the output of said photovoltaic power system

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based on the comparison result,

wherein said photovoltaic power system is diagnosed as normal only if said measured output characteristic is greater than a first predetermined value and less than a second predetermined value, said first and second predetermined values being based on said reference output characteristic.

Claim 26 (New): The diagnosis method according to claim 1, wherein
said reference output characteristic vary in accordance with actually measured output characteristic.

Claim 27 (New): The diagnosis method according to claim 9, wherein
said reference output characteristic vary in accordance with actually measured output characteristic.